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Existence of solutions of anisotropic elliptic equations with nonpolynomial nonlinearities in unbounded domains

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Abstract

© 2015 Russian Academy of Sciences (DoM), London Mathematical Society, Turpion Ltd. The paper is concerned with the solvability of the Dirichlet problem for a certain class of anisotropic elliptic second-order equations in divergence form with low-order terms and nonpolynomial nonlinearities (Equation presented) The Carathéodory functions aα(x,so,s), α = 0,1,...,n, are assumed to satisfy a joint monotonicity condition in the arguments s0 ∈ ℝ, s ∈ ℝn. Constraints on their growth in s0, s are formulated in terms of a special class of convex functions. The solvability of the Dirichlet problem in unbounded domains Ω C ℝn, n ≥ 2, is investigated. An existence theorem is proved without making any assumptions on the behaviour of the solutions and their growth as |x| → ∞.

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Keywords

Anisotropic elliptic equation, Existence of a solution, Nonpolynomial nonlinearities, Orlicz-Sobolev space, Unbounded domain